

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

FENCING

New York (supplement)

(feet)
code 382

DEFINITION

Enclosing or dividing an area of land with a suitable permanent structure that acts as a barrier to livestock (does not include temporary fences).

PURPOSE

To: (1) exclude livestock species from areas which should not be grazed; (2) to confine livestock on an area; (3) to subdivide grazing land to permit use of grazing systems; and (4) to protect new seedlings and plantings from grazing.

CONDITIONS WHERE PRACTICE APPLIES

On any area requiring control or exclusion of livestock.

PLANNING CONSIDERATIONS

(1) Kinds and habits of livestock, (2) location and adequacy of water facilities, (3) topographic features, (4) soil-site characteristics, (5) location of fences relative to livestock handling facilities, (6) equalization of forage producing ability among grazing units as feasible and practical, (7) proposed or potential grazing system, (8) federal, state, or local fencing codes, and (9) landscape and on-farm resources.

SPECIFICATIONS GUIDE

This type of fence may be installed to meet the manufacturers specifications, or a "generic" fence may be constructed to meet or exceed the following specifications.

High Tensile - Electric Fence

1 Wire

A) Quality - Wire will be new, smooth, and meet or exceed the following specifications:

Tensile Strength - 100,000 psi.
Galvanizing - Class III
Gauge - 14

B) Spacing, Height, and Number of Wires - Perimeter fences will be constructed with a minimum of 2 wires and should meet or exceed the number of wires specified in Table 1

for the kind of livestock to be constrained. The minimum height of the top wire should not be less than 34 inches (50 Inches for horses).

Table 1
Wire Spacing For Electric High Tensile Fence

Fence Description	Number Electrified	Wire Spacing from earth in inches (Reading from left to right)
2 Strand Dairy Cows, Heifers Steers, Cow/Calf	2	14-20 and 34-38
5 Strand Sheep and Goats	3	7-13-20-28-38
7 Strand Horses and Bulls	3	12-18-24-30-36-42-50

Note: Adjustments in number or spacing of wires may be made if they strengthen or increase the effectiveness of the fence.

C) Interior Fences - Inside or subdivision fences may be constructed using electrified polywire, polytape, flexinet, or steel wire and moveable or permanent post and spacer combinations. One, two or three wires may be utilized depending on the needs of the grazing system. At least one wire must be electrified.

2 Energizers

Manufactured fence chargers are to be used which are safety approved by the U.S. Bureau of Standards, Underwriters Laboratories (UL), or other International standards such as Canadian CSA or New Zealand NZS6203 part IP 1983, with notice of approval printed on the controller name plate.

Fence energizers may be solar, 120 volt, or battery powered and must be installed as per the manufacturers recommendations.

Chargers shall be grounded and protected from lightening.

3 Insulators

Choose from the following:

High density molded plastic, U.V. light resistant; flexible tube type; or, high density porcelain.

Insulators must be strong enough to support long stretches of wire, and allow the wire to slide freely.

4 Posts

A) Material - All brace, corner, and gate posts will be of such species as black locust, red or white cedar, pressure treated softwood, or other wood of equal life and strength are

acceptable. Line posts may be black locust, red or white cedar, pressure treated softwood, or standard fiberglass or steel “T” or “U” posts.

B) Size and Setting Depth - All corner, brace assembly, or gate posts shall be 5 to 6 inches in diameter or 4 inch by 4 inch pressure treated lumber by 7.5 to 8.0 feet in length. Corner, brace and gate posts shall be set 3.5 to 4.0 feet deep.

All wooden line posts shall be a minimum of 3.5 to 4.0 inches in diameter by 5.5 to 6.0 feet in length. Steel or fiberglass “T” or “U” posts shall be the same length as for wooden posts.

Line posts shall be set 1.5 to 2.0 feet deep.

C) Spacing -The maximum spacing between primary line posts is dictated by the topographic features of the land and whether battens or spacers are used. See Table 2 for maximum spacing.

Table 2
Spacing Of Fence Posts for High Tensile Electric Fence

Number of Wires	Maximum line post Spacing (Feet)		Maximum Spacer Spacing (Feet)
	With Spacers	W/O Spacers	
2	150	75	75
5	150	50	50
7	66	33	33

5 In-Line Strainers

Each wire will have one permanent in-line wire strainer to maintain correct tension every 1200 to 4000 feet. 4000 feet for straight line stretches, every 2500 feet with one 90 degree corner, and every 1200 feet for uneven terrain with significant dips and rises or non-straight fence lines.

In-line strainers should be placed near the center of the fence line to achieve equal tension at both ends of the line. The use of in-line strainers with tension springs is optional.

6 Batten Spacers

Batten spacers shall be pressure treated hardwood, 40 to 48 inches in length by 1.0-1.5 inch by 1.0 inch or fiberglass “O” or “T” posts 4 to 5 feet long.

7 Brace Assembly

A double brace assembly will be required for gates, ends, and corners when greater than 5 strands of wire are used (see Figure 1). A single brace assembly may be used with 5 or fewer strands of wire (see Figures 2 and 3).

Horizontal braces will be wood 4 to 5 inches in diameter or a minimum 1.5 inch diameter galvanized steel pipe 7.5 to 8 feet in length placed 3 to 4 feet above the ground.

Brace post pins shall be .375 by 4 inches and .375 by 9 inch galvanized steel rods.

Brace wires shall be 14 gauge high-tensile wire, double wrapped. Brace wire twist sticks shall be of hardwood and be a minimum of 1.5 inch by 2.0 inch by 2.00 feet in length.

8 Installation and Fastening

Attach wire to side of post next to livestock, except on curves and corners. At gate and end braces, wrap wire around post and tie off with the appropriate knot (see Figures 4 and 5) or use crimp sleeves to secure. Wire must be wrapped around the outside of corner posts unless swing corners are utilized (see Figure 6).

With swing corners, use Porcelain Type O or Polypropylene Type W Insulators.

Where wires must be joined together they will be connected with crimp sleeves or tied with the appropriate knot (see Figure 4).

Staple wire to post with 1.75 inch by 9 Gauge slash cut point staples, except 1.0 inch minimum length will be permitted for very hard wood such as black locust. Do not drive tight in line posts. This allows the wire to slip when expansion and contraction occurs. Drive staples into posts at an upward angle in depressions and at a downward angle on knolls. Staples should be driven diagonally with the wood grain to avoid splitting.

Where there is a gate(s) between the energizer and other portions of the fence, electrical currents will be carried across the opening by an overhead wire or an insulated 14 gauge wire buried under the opening.

Horizontal brace posts will be notched or pinned into the perpendicular brace post and perpendicular brace post being braced. The horizontal brace post shall be located at the center of the top one-third of the brace post. A tension member composed of two complete loops of 14 gauge high tensile wire shall extend from a point 4 inches down from the top of the brace post to the ground level of the post being anchored. The two loops of 14 gauge wire shall be twisted to secure the brace and provide the needed rigidity; or a diagonal brace may be used, where the diagonal brace is notched and nailed into the brace post at ground level. Then two complete loops of 14 gauge wire shall extend from the top of the brace post to ground level of the post being anchored, and twisted.

9 Anchoring Post or Battens in Depressions

High tensile fences require special provisions for holding posts in depressions, otherwise posts will be pulled from the ground. The use of one or more “deadmen” per post may be required, or longer posts will have to be driven deeper and at a closer spacing on both sides of the depression.

10 Warning Signs

Should be placed on electrified fencing along roads and near gates. Children should be so advised of the fence, and young children kept away from it.

High Tensile- Non-Electrified Fence

11 Wire

A) Wire quality - Wire will be new, smooth, and meet or exceed the following specifications:

Tensile Strength - 100,000 psi.
Galvanizing - Class III
Gauge- 14

B) Spacing, Height and Number of Wires - Perimeter fences will be constructed with a minimum of 6 wires. The minimum height of the top wire should not be less than 46 inches (50 inches for horses). Cross fencing will be constructed to the same specifications as the perimeter fence. See Table 3 for wire spacing.

13 Posts

A) Material - All brace, corner and gate posts will be of such species as black locust, red or white cedar, pressure treated softwood, or other wood of equal life and strength are acceptable.

Line posts may be black locust, red or white cedar, pressure treated softwood, or standard fiberglass or steel "T" or "U" posts.

B) Size and Setting Depth - All corner, brace assembly, or gate posts shall be 5 to 6 inches in diameter by 7.5 to 8 feet in length. Corner, brace and gate posts shall be set 3.5 to 4.0 feet deep. All wooden line posts shall be a minimum of 3.5 to 4 inches in diameter by 5.5 to 6 feet in length. Steel fiberglass "T" or "U" posts shall be the same length as for wooden posts. Line posts shall be set 1.5 to 2 feet deep.

C) Spacing - The maximum spacing between primary line posts is dictated by the topographical features of the land and whether battens or spacers are used. See Table 4 for maximum spacing.

Table 3
Wire Spacing For Nonelectric High Tensile Fence

Fence Description	Wire Spacing from earth in inches (Reading from left to right)
10 Strand livestock Feedlot	10-14-18-22-26-30-35 40-45-50
10 Strand Livestock Fence	5-10-15-20-25-30-35-45-50

8 Strand Sheep and Cattle Fence	5-10-15-20-25-30-35-40
6 Strand Cattle Fence (Not for calves)	15-20-25-30-35-40

Note: Adjustments in number or spacing of wires may be made if they strengthen or increase the effectiveness of the fence.

Table 4
Spacing Of Fence Posts for High Tensile Nonelectric Fence

Number of Wires	Maximum Spacing (Feet)		Maximum Spacer Distance (Feet)
	With Spacers	W/O Spacers	
6	100	33	33
8	66	33	33
10	30	10-16	10

14 In-line Strainers

Each wire will have one permanent in-line wire strainer to maintain correct tension every 1200 to 4000 feet. 1200 feet for uneven terrain with significant dips and rises or non-straight fence lines, every 2500 feet with one 90 degree corner, and every 4000 feet for straight line stretches.

In line strainers should be placed near the center of the fence line to achieve equal tension at both ends of the line. Use of in-line strainers with tension springs is optional.

15 Batten Spacers

Batten spacers shall be pressure treated hardwood, 40 to 48 inches in length by 1.0-1.5 inch by 1.0 inch or fiberglass "T" posts 4 to 5 feet long.

16 Brace Assembly

A double brace assembly will be required for gates, ends and corners (see Figure 1).

Horizontal braces shall be wood 4 to 5 inches in diameter or a minimum 1.5 inch diameter galvanized steel pipe 7.5 to 8 feet in length placed 3 to 4 feet above the ground.

Brace post pins shall be .375 by 9 inches and .375 by 4 inch galvanized steel rods.

Brace wires shall be 14 gauge high-tensile wire, double wrapped with 1.5 inch by 2.0 inch by 2.0 feet long hardwood twist sticks.

17 Installation and Fastening

Conservation practice standards are reviewed periodically
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and updated as needed. To obtain a current
1995
version of this standard, contact the USDA Natural
Resources Conservation Service

NRCS, NHCP-
January,

At gate and end braces, wrap wire around post and twist wire or use crimping sleeves or wire anchors through post for maximum strength. Place wire around the outside of corner posts or use swing corners. See Figure No. 6 after the discussion for high tensile electric fence.

Attach wire to side of post next to livestock, except on curves. With swing corners, use Porcelain Type O or Polypropylene Type W insulators. Otherwise wire must be installed on the outside of corner posts.

Where wires must be joined together they will be connected with crimping sleeves, wire anchors, or similar connectors.

Staple wire to posts with 1.75 inch by 9 gauge slash cut point staples, except 1.0 inch minimum length will be permitted for very hard wood such as locust. Do not drive staples tight in line posts. This allows the wire to slip when expansion and contraction occurs. Drive staples into posts at a downward angle on knolls and at an upward angle in depressions. Staples should be driven diagonally with the wood grain to avoid splitting.

Horizontal brace posts will be notched or pinned into the perpendicular brace post and the perpendicular brace post being braced. The horizontal brace post shall be located at the center of the top one-third of the brace post. A tension member composed of two complete loops of 14 gauge high-tensile wire shall extend from a point 4 inches down from the top of the brace post to the ground level of the post being anchored. The two loops of 14 gauge wire shall be twisted to secure the brace and provide the needed rigidity; or a diagonal brace may be used, where the diagonal brace is notched and nailed into the brace post at ground level. Then two complete loops of 14 gauge wire shall extend from the top of the brace post to ground level of the post being anchored, and twisted.

18 Anchoring Posts or Battens in Depressions

High tensile fences require special provisions for holding posts in depressions - otherwise posts will be pulled from the ground. The use of one or more "deadmen" per post may be required, or longer posts will have to be driven deeper and at a closer spacing on both sides of the depression.

Conventional- Nonelectric Fence Barbed Wire Fence

A barbed wire fence shall have a minimum of three barbed strands. The strands shall be spaced approximately an equal distance apart. The bottom wire shall be approximately 14 to 18 inches above the ground level. The barbed wire shall be two twisted strands of 12 1/2 gauge or heavier wire, with 14 1/2 gauge (or heavier), two point (or more) barbs on approximately 5-inch centers. The wire and barbs shall be galvanized (see Table 5.)

19 Wooden Fence Posts

A) Durability - Untreated posts will be such species as black locust, red or white cedar. Pressure treated pine or other wood of equal life and strength are acceptable.

B) Size - Line posts will have a minimum top diameter of 3 inches and be of sufficient length to support the height of the fence, and be firmly set or driven in the ground a minimum depth of 2 feet. Corner, gate end and brace posts will have a minimum top diameter of 5 inches and be of sufficient length to support the height of the fence, and be firmly set or driven in the ground a minimum depth of 3 feet.

Table 5
Fence Construction for Barbed Wire or Woven Fence

Use	Height (inches)	Barbed Wire Strands	<u>Woven Wire</u>	
			Stay Spacing (inches)	Gauge (1)
Cattle or Mixed Livestock	44	3 or 4	6 or 12	11
Hogs (2)	32	2	6	9
Sheep or Goats	39	4	6 or 12	9
Horses	48	-	6 or 12	11
Deer	94	-	6 Bottom 12 Top	9

(1) Minimum gauge top and bottom strands of fabric.

(2) At least one strand barbed wire below woven wire fabric.

20 Steel Posts

Standard "tee" or "u" section steel posts weighing not less than 1.1 pounds per foot of length may be used in lieu of wooden line posts. Lengths shall be the same as for wooden posts. Steel posts shall be studded, embossed or punched for attaching the wire to the post. Unless punched posts are used, the wire shall be attached to the post by wrapping No. 16 gauge galvanized wire around the strand or by use of manufactured wire clips.

21 Bracing

A single unit (minimum) brace assembly is required at all corners, ends, gates, and all definite angles 15 degrees or more in the fence line (see Figure 2).

The horizontal brace shall be wood with a minimum of 4 inches in diameter or 1 1/2" or larger diameter pipe and have a length 7 1/2 to 8 feet. It will be pinned or notched into the brace post and the post being braced. The horizontal brace shall be located at the center of the top one-third of the brace post and the post being anchored. A tension member composed of two complete loops of No. 9 gauge smooth wire shall extend from a point 4 inches down from the top of the brace post to the ground level of the post being anchored. The two loops of No. 9 wire shall be twisted to secure the brace and provide needed rigidity; or a diagonal brace may be used, where the diagonal brace is notched and nailed into the corner post approximately 9 inches from top of post, with the other end of diagonal brace notched and nailed into the brace post at ground level. Then two complete loops of No. 9 gauge smooth wire shall extend from the top of the brace post to ground level of the post being anchored and twisted.

A brace post assembly will be installed in straight fence section at intervals of no more than 660 feet or at any point where the vertical grade change is in excess of 18 percent.

22 Tree Posts

Live trees in line with a planned fence can be used as posts. Trees should have sound wood and be at least 4 inches in diameter.

23 Staples

Staples shall be No 9 gauge galvanized wire and have a minimum length of 1 1/2 inches, except 1 inch minimum length will be permitted for very hard wood such as locust.

Staples shall be driven diagonally with the wood grain to avoid splitting. The staples shall not be driven into the post so deeply that the wire will not move when tightened or with expansion and contraction.

24 Spacing of Posts

Line posts for conventional fences shall be spaced a maximum of 16 feet.

Woven Wire Fence

Fence with woven wire less than 32 inches high shall have at least two barbed wires or electrified smooth wires above the woven wire. Fences with woven wire 32 inches or higher must have at least one barbed wire or electrified smooth wire above the woven wire. The top and bottom wires in the woven wire fence shall be 11 gauge or heavier, and stay wires shall be 14 gauge or heavier. All wires shall be galvanized (see Table 5). The wire above the woven wire fence shall be the same as specified for Barbed Wire Fence or Conventional Electric Fence.

Posts, bracing, and staples shall be installed as described in 19.

Spacing of line posts will be determined by the length of fence panels to a maximum of 16 feet.

Wooden Board Fence

25 Boards

- A) Kind - The boards shall be Douglas fir, western larch, southern yellow pine, white oak, or other wood of equal life and strength.
- B) Size - the rails shall be a minimum of 1 inch by 6 inches (nominal) by at least 8 feet long.
- C) Treatment - Unless painting is selected, lumber shall be treated with creosote or comparable preservative. If painting is desired, lumber shall be treated with an anti-fungal agent in a light oil (mineral spirits or kerosene) or a waterborne preservative such as acid copper chromate or chromated zinc chloride.
- D) Spacing - A wooden fence shall have a minimum of 3 boards. The boards shall be spaced on 16 inch centers with the top board approximately 48 inches above the ground for a 3 board fence and 64 inches above the ground for 4 board fences. The bottom board shall be approximately 16 inches above ground level.
- E) Nailing - Each board shall be attached to each post with two 16d galvanized or cadmium nails.

26 Posts

Posts shall be installed as described in 19A and B and spaced at a distance appropriate to the board length to a maximum of 16 feet.

Conventional - Electric Fence

A permanent electric fence shall have at least two strands of smooth or barbed wire, with at least one wire electrified. Careful consideration should be given before barbed wire fences are electrified. Posts and spacing of posts are the same as for non-electric fences. Corners are to be braced with installation of brace posts as described for non-electric fences.

Manufactured fence chargers are to be used which are approved by Underwriters Laboratories (UL) or the U.S. Bureau of Standards, with notice of approval printed on controller name plate. Fence chargers may be powered by 120 volt current or by batteries. Installation of the charger will be according to manufacturer's instructions. Homemade fence chargers are not acceptable or recommended for use with fencing. Chargers shall be grounded and protected from lightning according to manufacturer's recommendations.

Wire for use with electric fences will be 12 1/2 gauge for barbed wire and 12 gauge for smooth wire. Manufactured fence insulators are to be used to fasten electric wire to the post. Non-electric wires do not need to be insulated by the fastening system. Wire fasteners made of 12 gauge or heavier galvanized wire may be used to fasten wire to insulators.

PVC (polyvinyl chloride) Posts - PVC posts may be used with electric fence. Lengths and spacing shall be the same as for wooden posts. Installation shall be according to the warranty issued by the manufacturing firm.

27 Energizers

Manufactured fence chargers are to be used which are safety approved by the U.S. Bureau of Standards, Underwriters Laboratories (UL), or other International standards such as Canadian CSA or New Zealand NZS6203 part IP 1983, with notice of approval printed on the controller name plate.

Fence energizers may be solar, 120 volt, or battery powered and must be installed as per the manufacturers recommendations.

Chargers shall be grounded and protected from lightning.

CROSSING STREAMS WITH FENCE

Landowners are to be encouraged to fence livestock away from streambanks. Where necessary to have livestock cross streams, recommend a protected cattle crossing and use a "break away" fence section across streams where high water, ice, and or debris may break the fence.

End the main fence at the top of the streambank on each side with an appropriate brace assembly. From a separate post driven next to the end brace and NOT wired to it, construct a separate section of fence across the stream. Where electric fence is used, use an overhead wire to complete electric current to the other side of the stream.

FENCES FOR DEER EXCLOSURES

For protection of areas up to 30 acres in size, install a 5 foot high, 6-wire vertical or slanted high tensile electric fence. For protection of areas larger than 30 acres, install a 4 foot high, 7-wire slanted, high tensile electric fence as illustrated in Figure 8.

For the 5 foot high, 6-wire fence, the wire spacing shall be, starting from the ground 8, 8, 8, 8, 12, 12 (inches).

Eight foot high woven wire fence constructed of several sections of hog fence connected with hog rings will also exclude deer. However, these fences are generally more difficult to install and maintain in a deer proof condition, as deer will crawl under the fence in depressions and areas where the fence is not tight.

Completely enclose the area to be protected with fence. Wire, grounding, tension springs, braces, insulators, gates and energizers shall conform to specifications described in Section 2 of the High Tensile Electric Fence Supplement. The energizer shall be capable of maintaining a minimum charge of 3500 volts throughout the fence (greater than 4000 volt capability is more effective).

The wire spacing **MUST** be maintained uniformly throughout the fence using anchored battens and posts as deer will crawl under the fence in depression areas. Level the ground where necessary.

Space the line posts and rails at not more than 60 feet apart with battens or spacers at 20 foot intervals.

Maintain an open area at least 6 to 8 feet wide around the outside perimeter of the fence. The area under the fence and one foot either side should also be maintained in a vegetation free condition to prevent grounding.

All wires must be maintained charged at all times except during the winter. Snow acts as an insulator. When snow is accumulating, connect alternate wires to the electric ground starting with the second wire above the soil surface. The lowest wire should still be energized. When the lower wire is covered with snow, reconnect the energized wires and ground wires so that every other wire is carrying voltage. The first wire above the snow should be energized. Reconnect the wires as the snow cover changes.

Contact the NYS DEC Regional Wildlife Manager for assistance in planning deer enclosures.

FINAL DOCUMENTATION REQUIREMENTS

The completed work is to be checked and documented to verify that the practice is complete according to SCS standards and specifications. Supporting data for documentation includes those features of this practice that can be measured and observed, such as:

1. Length of fence installed;
2. Type of fence and other materials installed; and
3. Signature of the performance checker.